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ABSTRACT

Data from the National Longitudinal Study of Adolescent Health were used to examine contextual and class influences on interracial friendship formation among black, white, Asian, and Hispanic students in grades 7-12, noting the effect of busing programs in interracial friendships and examining whether students had fewer friends in schools in which they were racial minorities. Overall, little of the racial segregation in friendship resulted from class friendship segregation. For Hispanics, racial identification as white or black strongly related to the race of friends selected. For members of racial groups in small minorities within schools, the odds increased that same-race dyads were friendship dyads. There was no significant negative effect of busing on interracial friendship formation. Students attending racially diverse schools had more interracial friendships than those in homogenous schools. Attending racially diverse schools decreased the number of school friends named by white students. Results suggest that the increasingly Asian and Hispanic schools of the future will have some reduction in the level of racial segregation of friendship networks relative to current schools, but high levels of racial segregation of friendships will continue. Also, black-white divisions will continue to be important in multiracial schools. (Contains 39 references.) (SM)

**Segregation Forever?
Racial Composition and Multiracial Friendship Segregation
in American Schools**

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Abstract

Although past evidence suggests that there are more interracial friendships in racially integrated black-white settings than in racially segregated settings, little is known about patterns of segregation among students who are not black or white. Using data from the National Longitudinal Study of Adolescent Health to study contextual and class influences on interracial friendship formation among students in grades 7 to 12, we find that (1) little of the racial segregation in friendship results from class friendship segregation; (2) for students of Hispanic origin, their racial identification as white or black is strongly related to the race of friends selected; (3) for members of racial groups in a small minority within a school, the odds increase that a same-race dyad is a friendship dyad; (4) there is no significant negative effect of busing on the integration of friendships; and (5) attending a racially diverse school decreases the number of school friends named by white students. The results suggest that the increasingly Asian and Hispanic schools of the future will have some reduction in the level of racial segregation of friendship networks relative to current schools, but high levels of racial segregation of friendships will continue.

Segregation Forever?
Racial Composition and Multiracial Friendship Segregation
in American Schools

Although the social science statement to the court in *Brown v. Board of Education* discussed desegregation as a policy to increase the achievement and self-esteem of black children, contemporary discussions focus on fostering improved race relations as a major rationale for desegregation. Central to this goal is the proposition from social psychology that cooperative, equal-status contact² between persons of different races will tend to improve interracial attitudes (Allport, 1954). Supporters of desegregation programs hope that racially diverse schools will become settings for hostility-reducing interaction, fostering interracial friendships and, in the long run, contributing to a more integrated and equal society.

It should not be surprising that the practice of school integration has not completely lived up to this aspiration. More than 40 years after the end of de jure segregation of schools, the vision of schools as integrated institutions remains far from realized. Despite the growing racial diversity of the American population, most schools remain dominated by a single racial group. In 1996, the average white student attended a school that was 81 percent white, the average black student a school that was 55 percent black, and the average Hispanic student a school that was 53 percent Hispanic (Orfield and Yun, 1999). Even in numerically integrated schools, the experience of most students is of racial separation rather than integration, because social activities and friendships in many integrated schools are highly segregated by race (Hallinan and Williams, 1989; Clotfelter, 2000).

With the dismantling of many court-ordered desegregation plans, the primary force promoting school integration now is demographic change. Since 1960, the proportion of Hispanics in the nation's public school population has more than tripled, and Asians have gone from being an almost invisible minority to constituting 4 percent of all students (Orfield and Yun, 1999). The result has been a gradual decline in the share white in the school of the average white student, and the emergence of increasing numbers of schools with multiracial populations.

Because most prior research has focused on black-white desegregation, little is known about race relations in these emerging multiracial schools. Are the social relations of Hispanic and Asian students as influenced by race as they are for white and black students? We consider this question through an analysis of patterns of interracial friendship formation among white, black, Asian, and Hispanic students using data from more than 80,000 students in the National Longitudinal Survey of Adolescent Health (Add Health). We focus on how the relative size of racial groups in a school influences interracial friendship relations. We also address several additional questions important for understanding racial divisions in schools. (1) Do class differences among students explain racial segregation in friendship? (2) Do students have fewer friends in schools in which they are in the racial minority? (3) What is the influence of school busing programs on interracial friendships? Before presenting our results, we first discuss relevant theories of friendship formation and past studies of friendship segregation in schools.

PAST RESEARCH

Studies of friendship have identified many bases of interpersonal attraction, including homophily, propinquity, status, and reciprocity (Hallinan and Williams, 1989). Particularly relevant for understanding friendship in racially diverse schools are homophily, the tendency to form friendships with similar others, and propinquity, the tendency to form friendships with others who share the same social situation. Propinquity reflects the fact that the frequency of day-to-day contacts among strangers strongly predicts the likelihood of friendship formation, as demonstrated most convincingly by the famous college dorm experiment of Festinger, Schachter, and Back (1950). If homophily is extremely strong, however, even regular intergroup contact may not lead to cross-group friendships.

A useful baseline expectation for the composition of social networks resulting from propinquity is the pool of *potential* ties among all individuals in a setting (McPherson, Smith-Lovin, and Cook, 2001). In this baseline, individuals are expected to have friendship networks that reflect the group composition of the social setting. As Blau (1977) notes, this implies that there will be more ties of the minority to the

majority than of the majority to the minority. The total number of cross-group ties will be maximized when groups are of equal size.¹ Because the settings from which friends are chosen are usually relatively homogeneous, propinquity usually contributes to segregated social networks (Feld, 1981). Racially integrated schools are an exception to this principle, in which propinquity increases the racial diversity of friendship ties.

In addition to the effects on friendship caused by the *mathematical* relationship between relative group size and potential interracial friendships in the tie pool, the relative size of minority and majority groups may also have a *behavioral* influence on intergroup relations. Individuals may alter their friend-making behavior, for instance, to ensure that they have a number of same-race friends, or in response to changes in the racial environment with changes in relative proportions. Tatum (1999), for instance, argues that racially similar peers are important to fulfill psychological needs for social support. To maintain a network of racially similar peers in situations in which most peers are racially dissimilar, either the tendency to choose same-race friends from potential friends or the total size of social networks must increase. Likewise, St. John and Lewis (1975) suggest that groups may feel threatened in classrooms where they are heavily outnumbered. When group size is highly imbalanced, the high rates of threat to one group would then lead to more exclusive friendship selections.

Changes in the racial composition of friendship networks may be accomplished through several changes in network structure. Students may intensify efforts to make same-race friendships rather than other-race friendships, increasing the strength of selection based on similarity. Students may also choose to make friends with more racially similar persons from other contexts rather than from their school. Finally, if racial differences are sufficiently strong, students may end up with smaller social networks overall. Indeed, social isolation is one of the most common concerns of parents of children in social

¹Feld and Carter (1998) show that in some situations, increasing integration can decrease the number of interracial weak ties among students. This result does not hold, however, for this hypothetical baseline distribution or for the strong ties that are the focus of the empirical analysis in this paper.

situations dominated by members of other racial groups (Tatum, 1987, 1999). The possibility that students reduce the size of their social network in schools with few same-race peers is troubling because friendship fulfills important psychological functions in adolescence.

Past Sociometric Analyses of Racial Segregation in Friendship

Some bases of similarity are more important to friendship formation than others. Clearly, race is a more important basis of friend selection than eye color. Bases of similarity important for friendship in prior analyses include sex (Hallinan, 1982), age (Laumann, 1973), race (Hallinan and Williams, 1989), attitude similarity (Newcomb, 1961), and social class (Tudor, 1971; Laumann, 1973). McPherson, Smith-Lovin, and Cook (2001), following Lazarsfeld and Merton (1954), distinguish between *status homophily*, in which friendship similarity is based on ascribed or achieved status characteristics, and *value homophily*, in which homophily is based on similarity of internal states or behavior following from these states. Values are influenced by status characteristics, and thus value homophily often acts as a mediating mechanism of status homophily.

Studies find high levels of racial homophily even in integrated schools. Hallinan and Williams (1989), in the most comprehensive study of racial homophily among secondary school students, find that students are only one-sixth as likely to realize a possible friendship with a schoolmate of a different race as with a schoolmate of the same race. Studies of elementary children likewise report tendencies toward own-race selection, although racial homophily is weaker among children than adolescents (e.g., Hallinan, 1982; Gerard and Miller, 1975).

Despite the strength of homophily based on race, most studies find increases in interracial friendship with increases in school racial diversity. Hallinan (1982) and Hallinan and Smith (1985) find more friendships between black and white elementary school students in racially diverse classrooms than in racially segregated ones. Hallinan (1982) and Schofield and Sagar (1977) find increases in black-white friendships following implementation of school desegregation in elementary classrooms and a junior high school. Likewise, Patchen (1982) finds that about 20 percent of white students in desegregated high

schools in Indianapolis list a black student as one of their five best friends, and concludes that this probably represents an increase in interracial friendships since desegregation. Joyner and Kao (2000) report that school racial diversity is associated with the share of students with interracial friendships in a cross-sectional sample of schools from the Add Health study. Likewise, Moody (forthcoming), also using the Add Health data, finds an increase in friendships across racial lines with increasing racial diversity, although the increase is not linear. Gerard and Miller (1975), on the other hand, discern little change in racial segregation in friendship choice following desegregation in elementary schools in a California school district.²

These studies vary in their controls for other bases of status homophily that may confound selection based on race. Some studies include few or no controls for other bases of friendship matching, while other studies include extensive controls (e.g., Hallinan, 1982; Hallinan and Williams, 1989). Hallinan and Williams (1989) include controls for many dimensions of similarity that may influence friendship matching, including age, sex, and presence in the same grade. An important characteristic that few studies control for in friendship selection is the social class background of students (Moody, forthcoming, is an exception). Schofield (1982), in an insightful ethnographic study of an interracial middle school, argues that several of the differences in attitudes and behavior that form a barrier to friendships in the schools she studies are based on class rather than race differences, although students think of these class differences in racial terms. This explanation may hold true more generally, but quantitative analyses have not systematically examined the possibility that much apparent race-based similarity in friendship is actually grounded in class-based similarity.

The internal organization of racially diverse schools also influences the extent of interracial friendship (Schofield, 1982; Hallinan and Teixeira, 1987; Hallinan and Williams, 1989; Kubitschek and

²Hallinan and Williams (1989) use a large sample of national data from the High School and Beyond study to examine racial homophily. Yet, as they discuss, because the High School and Beyond study interviewed only a small subsample of students from each school, it is not possible to draw conclusions about the way in which the racial composition of schools influences friendship formation based on their sample (Hallinan and Williams, 1989, footnote 6).

Hallinan, 1998; Moody, forthcoming). School practices may influence friendship formation either by influencing school racial climate or through structuring the frequency of contact among races within the school. Hallinan and Williams (1989) and Kubitschek and Hallinan (1998), for instance, find that tracking in high schools has a small but consistent effect of increasing the segregation of friendship networks.

Of particular relevance to racial homophily are schools that enroll students based explicitly on policies designed to increase racial balance in school populations, usually involving busing of students across geographic district lines. Some believe that school busing creates racial animosity among students, as it has in some cases among parents, possibly reducing the number of interracial friendships. Moody (forthcoming) is the only prior study to examine the role of school busing on interracial friendship. He finds that schools enrolling students through busing programs have higher levels of friendship segregation than schools that do not—suggesting that busing may decrease interracial friendships in intentionally desegregated schools.

Racial Segregation and Diversity among Multiple Racial Groups

Past studies suggest that there is an increase in the number of cross-race friends in white-black integrated settings, although the magnitude of the increase varies. We build upon this prior work by (1) examining changes in friendship among racial groups other than blacks and whites, (2) considering school composition effects on the size of friendship networks in addition to effects on the racial composition of friendship networks, and (3) evaluating the effect of race on friendship while simultaneously holding constant class differences that may confound race-selection effects.

Most prior studies consider only black-white social segregation. Two recent articles, however, are important exceptions. Joyner and Kao (2000) and Moody (forthcoming) use data from the Add Health study to consider school segregation, including segregation among persons not white or black. Joyner and Kao (2000) categorize friendships as same-race or cross-race, and consider the relationship between share of the school population same-race and interracial friendship for several racial groups. Moody (forthcoming) examines overall levels of friendship segregation, again dividing respondents into same-

race and other-race, and using single indices of total school racial segregation. Results are not reported in either study for particular pairings of racial groups (e.g., black-white, black-Asian, etc.).

Unlike these past studies, we examine relations for combinations of three basic racial groups—white, black, and Asian—and three breakdowns of Hispanic respondents—white Hispanic, black Hispanic, and other Hispanic. In other contexts, segregation often differs for different combinations of racial groups, distinctions being lost in considering racial groups as same-race and other-race. White-Asian and white-Hispanic combinations, for instance, show higher rates of intermarriage and lower levels of residential segregation than white-black patterns (Qian, 1997; Massey and Denton, 1987). These same patterns may hold for friendship segregation.

DATA

We examine friendship matching using data from the in-school survey of the National Longitudinal Study of Adolescent Health (Add Health). The Add Health study is designed to provide a sample that represents the universe of all schools in the United States with students in grades 7 to 12. Add Health interviewed all students present at school on the survey day in 144 schools in 80 communities, completing a total of 90,118 interviews. We eliminated data from students who did not answer questions on race, Hispanic origin, grade, sex, grade point average, mother's education, or mother's occupation. That is, we handle missing data through listwise deletion.³ We also discarded data from several schools for which almost no friendships with other students in the school were reported. This left us with a base sample of 53,090 respondents. For more on the Add Health Study, see Bearman, Jones, and Udry (1997).

Because the student questionnaire included *all* students in a large sample of schools, it is uniquely suited to addressing how school composition influences friendship segregation. Many students named as

³More than half of the missing cases resulted because data were missing on mother's education, mother's occupation, or grade point average. We have also used regression to impute values for missing data on these three variables, allowing these cases to be included in the analysis. Results using these models were similar to those based on listwise deletion, and in no way altered any substantive conclusions.

friends are also members of the sample. This allows friends to be matched and allows us to determine the characteristics of friends based on their responses to the survey.

Measuring Friendship

The Add Health in-school questionnaire asks students to list their five best male friends and, in a separate question, their five best female friends (including girlfriends/boyfriends).⁴ Students write in the names of their five best friends as placeholders, then are asked to look up their friends on a roster of students in their school and a sister school and write in the identifying code matching that friend. A separate code is written in to indicate that the friend does not go to either the sister or sample school.⁵

We examine only the selection of same-sex friends. The dynamics of other-sex friendship selection in adolescence are probably somewhat different than same-sex friendship, particularly because other-sex friends include romantic attachments.⁶ We consider interracial friendship for cross-sex pairs as a separate topic worthy of its own, separate investigation.

Our measure of friendship is based on the students' selection of their (up to) five closest same-sex friends. As Hallinan (1974) points out, there are potentially two problems with this method of determining friendship. First, respondents who want to name more than five friends are limited to five. Second, there may be implicit pressure in the fixed-number format to name as many friends as are allowed. Some respondents may list five names simply to fill the blanks. Despite these limitations, Schofield and Whitley (1983), in a comparison of sociometric methods of measuring friendships, find this

⁴The exact wordings of the friend questions are: "List your closest (male/female) friends. List your best (male/female) friend first, then your next best friend, and so on. (Girls/Boys) may include (boys/girls) who are friends and (boyfriends/girlfriends)."

⁵Add Health staff, personal communication.

⁶It is impossible to distinguish other-sex friends from romantic relationships in the Add Health in-school survey.

to be a valid method of friendship selection. They do make the important point, however, that this method tends to identify close friends only, leaving out what we might call "friendly acquaintances."⁷

Racial segregation of friends is likely to be higher than segregation of acquaintances. Schofield and Whitley (1983) argue that using close friendships to assess friendship integration in desegregated environments is too strict a standard for judging desegregation programs in racially segregated America. We believe, however, that it is important to study strong friendship ties as well as weaker acquaintances because friendships are more likely to have a lasting effect on major attitudes and behaviors than are acquaintances. Powers and Ellison (1995) find that blacks who report having close friendships with whites as children express more favorable views of whites and race relations generally than do blacks who do not; they find that casual contact in desegregated settings, on the other hand, has little effect on black racial attitudes. Friendships have been shown to influence attitudes toward school (Sewell, Haller, and Portes, 1969) and drug use (Kandell, 1978), while shallower acquaintances have not.

Measures of Race

Like the 2000 census, the Add Health in-school survey presents a series of racial categories and allows respondents to choose more than one. The possible racial categories are: white, black, Asian or Pacific Islander, Native American, and other. In a separate question, respondents are asked if they are of Hispanic descent.⁸

This raises the issue of defining racial categories for students who check more than one racial category. We initially thought of using a conventional coding system that considered some race categorizations as "dominant," for instance counting everyone who checked black and another race as black. We were concerned, however, that multiracial students may differ systematically in their friendship

⁷In contrast, Schofield and Whitley (1983) find that the roster-and-rating method identifies both close and distant friends

⁸The race question is: "What is your race? If you are of more than one race, you may choose more than one." The Hispanic question is: "Are you of Hispanic or Spanish origin?"

patterns. Students who check both black and white, for instance, might well have more friendships with whites because of their partially white identity than those who simply check "black."

Instead, we formed categories for single-race respondents, or adolescents who chose only one race. In total, we formed eight categories: white, black, Asian, white Hispanic, black Hispanic, other Hispanic, other race, and multiracial. The white, black, and Asian categories all include white, black, and Asian single-race students. Likewise, white Hispanic and black Hispanic are Hispanic students who indicate they are white or black, and no other race.⁹

The Hispanic other category includes two patterns of response to the race questions. First, we include respondents who chose Hispanic and "other" as their race, who make up about 36 percent of students who are of Hispanic descent. Second, we include students who indicated Hispanic and did not check any racial category, who make up 28 percent of persons who indicated Spanish/Hispanic background.¹⁰ Our guess is that students in the other Hispanic category think of Hispanic as their race, rather than thinking of Hispanic as an ethnic category distinct from race.

Finally, we include students who indicate they are of Native American or "other" race in an "other" category, and students who choose more than one race in a multiracial category. These last two categories are residual categories, included as controls but not analyzed at great length below. Our paper, then, focuses on friendship selection among single-race youth, who make up nearly 90 percent of students in the Add Health study. In another study we plan to investigate the friendship patterns of multiracial youth.

⁹Students' racial identification may also result from the racial composition of their friends. Unfortunately, we have no way of determining with certainty whether race is causing friendship selections or friendship selections are causing racial identification. We believe, however, that race probably influences friendship choices much more than friendships influence racial identification.

¹⁰Only about 1 percent of non-Latino respondents did not check any race category.

Measures of school racial composition—percentage white, percentage black, etc.—are calculated directly from the student race responses in the in-school survey. Race for these calculations is defined using the same coding as for individuals.

METHODS

Our analysis proceeds in two steps. In the first stage, we investigate contextual and individual influences on the number of same-sex friends named on the survey. In the second stage, we consider contextual and individual influences on matching between friends, holding the number of friendship selections constant.

Number of Friends Selected

Our initial investigation examines how the number of within-school friends (of all races) varies as a function of contextual and individual factors. We are particularly interested in the effect of school racial composition on the number of friends named. In addition, we examine whether school busing programs have a negative effect on the overall number of within-school friendships.

Students were allowed to name up to five friends, but many named fewer than five. We predict the (logged) number of within-school friends named, up to a maximum of five, as a function of the racial composition of the school and control variables.¹¹ For students who named five friends (regardless of whether all five were in-school friends), the number of friends named is censored—that is, they may have wanted to name more in-school friends than allowed by the questionnaire. To deal with this problem, we employ a regression with a correction for censoring. The resulting procedure is closely related to a tobit estimator, although it allows the point of censoring to vary across cases, unlike the classical tobit model. See Long (1997, Chapter 7), for a description of tobit models.

¹¹We added one to friendship selection before logging to allow the inclusion of students who named no friends.

This model corrects for censoring by assuming that the uncensored population distribution of number of friends can be approximated by a log-normal distribution. Fischer (1982), based on a survey including uncensored data on the size of friendship networks, finds that the logarithm of group size is the transformation among several that brings the friendship distribution closest to a normal distribution (see Fischer, 1982, Appendix A, section 4.3.2). Models without the correction for censoring differ little from those presented, and in no way alter the substantive results of this paper.¹²

We estimate models separately for students of each racial group. The independent variables of greatest interest are measures of school racial composition, broken into four categories, and a measure of whether the school enrolls students through a program designed to achieve racial balance.

In addition, we include several control variables at the individual and school levels to make sure these do not confound the racial composition effects. *Mother's highest education* is based on responses to a question on the in-school survey asking about highest grade and degree obtained. We recoded the variable into years of education attained.¹³ *Mother's occupation* is likewise based on a survey question asked of the student, in which occupation was indicated in up to 20 categories. We recoded this into a dummy variable for whether or not the mother works in a professional occupation, with mothers who do not work or who work in a nonprofessional occupation counted as 0. *Father's education* and *father's occupation*, included in some models below, are based on questions identical to those for the mother. *Grade point average (GPA)* of the student is based on self-reported grades and is coded on a conventional 0 to 4 scale.¹⁴ *Grade in school* is based on the student's self-report. *Public or private school, urban vs.*

¹²Censored-normal regressions were estimated using the Stata command *intreg* (StataCorp. 2001). The censored-normal correction increases the estimated model intercept substantially compared with ordinary least squares regression, but the slope estimates are largely unchanged.

¹³Are children's reports of their parents' education accurate? We were able to check this for the subsample of students whose parents were surveyed by Add Health. Child's report and mother's report of mother's education correlate .75; child's report and father's report of father's education correlate .8. Some of this disagreement likely results from error in parental reports. We conclude that the student reports are reasonably accurate.

¹⁴Students were asked to report their grade in the most recent grading period for English/language arts; mathematics; history/social studies; and science. These grades were averaged to calculate a GPA for all four subjects.

suburban vs. rural school, and a dummy variable indicating a *busing program* to achieve racial balance are based on reports of the school administrator, who was surveyed separately by Add Health.¹⁵

Models of Friendship Selection

Our second analysis investigates friendship matching as a function of the differences in the characteristics of potential friends. That is, we investigate how the relative characteristics of any two individuals in a school influence the likelihood that one will select the other as a friend. In what follows, the *senders* are the respondents in our study who are naming their five best friends. The *receivers* are the persons who *could* be chosen as friends by the senders, because they are students in the same school.

The simplest method of examining interracial friendship is to use a dependent variable to indicate either whether a student has any cross-race friendships (e.g., Joyner and Kao, 2000) or the number or share of friends who are of another race. A major limitation of this approach, however, is that it allows for consideration of only a single characteristic *of the receiver* in friendship formation. This modeling strategy is well suited to considering how characteristics of the sender influence the choice of a same-race or other-race friend, but it provides no way to examine the simultaneous matching on multiple dimensions that characterize friendship formation.

Several studies by Hallinan and her colleagues (e.g., Hallinan, 1982; Hallinan and Williams, 1989) use a more nuanced approach. Hallinan takes all possible dyads of students within a given social setting as the unit of analysis. By coding dyads in which one student named the other as a friend as 1 and other dyads as 0, friendship can be modeled as an outcome using logistic regression. Characteristics of the two students, including relative characteristics (e.g., whether both friends are of the same race, and/or the degree of class difference between them), can be used as independent variables.

¹⁵The busing variable is coded 1 if the school administrator indicates that "Pupils are assigned from several geographic areas in order to achieve a desired racial or ethnic composition of the school."

More recently, Wasserman and colleagues have developed models of determinants of network structure, P* models, based on models of network dependence from graph theory (Wasserman and Pattison, 1996; Anderson, Wasserman, and Crouch, 1999). Wasserman's model is based on a more developed formal model of network structure than Hallinan's, but in practice the two approaches are similar. Like Hallinan's model, the P* model takes the dyad as the unit of analysis and is estimated using logistic regression, a form of pseudolikelihood estimation for the formal structural model (see Wasserman and Pattison, 1996, and citations therein). The P* model adds further control variables to Hallinan's model to hold constant several structural features of networks that network theories predict are related to friendship formation. For instance, the P* model includes terms to capture the fact that, all else being equal, persons who have friends in common are more likely to be friends than persons who do not share friends in common. The P* model also includes a fixed effect (a dummy variable) for each sender and receiver, capturing the number of friends of the sender ("friendliness") and the number of persons who select each receiver ("popularity").

Our models are largely consistent with these approaches. We take within-school dyads as the basic unit of analysis. We create a file in which dyads represent all possible friendship pairs within a school. If there are n students within a particular school, there are a total of $[n*(n-1)]/2$ within-school dyads for that school. Consistent with P* models, each dyad is represented twice in the data, since each individual appears as both a sender and a receiver.¹⁶ This data structure implicitly controls for opportunities for contact among persons of different race in the school, since interracial dyads are represented in proportion to the racial diversity of the population of the school.

Note that the number of dyads increases geometrically with school size, becoming very large for large schools—a school of 100 students will be represented by $(100*99) = 9,900$ cases in our file. When

¹⁶That is, if A and B are two individuals in the same school, we include both A's possible choice of B and B's possible choice of A as cases, thus representing each pair dyad twice. Overall, then, there is a total of $n*(n-1)$ cases for each school (before samples of dyads are drawn, see text).

all within-school dyads are combined across the about 130 schools in our sample, the total number of friendship dyads is more than 5 million.

To analyze the data efficiently, we, like Hallinan and Williams (1989), choose a sample of dyads. We select all dyads in which one individual selected the other as a friend and a share of nonfriendship dyads. We select nonfriend dyads in proportions stratified by the race of the sender: 5 percent for whites, 15 percent for blacks, 20 percent for Asians, 50 percent for white Hispanics, 50 percent for black Hispanics, and 20 percent for other Hispanics. We then employ weights in the analysis to represent the sampling proportions, weighting by the inverse probability that a dyad is included in our sample.

The dependent variable is a dummy variable coded 1 for sender's choice of receiver as a friend and 0 for dyads in which sender does not choose receiver. Using logistic regression, we model this dependent variable as a function of independent variables capturing the difference between the characteristics of the member of the dyad.

More formally, let p_{ij} be the probability that the i th student will name the j th student in the same school as one of his/her five best same-sex friends. We examine friendship separately for senders of each race—one model for non-Hispanic whites, one for blacks, etc. We model the logit of the probability that the i th student will select the j th student as a friend as function of characteristics of the dyad:

$$\ln\left(\frac{p_{ij}}{1-p_{ij}}\right) = \sum_a \alpha_a \text{friendliness}_{ai} + \sum_b \beta_b \text{popularity}_{bj} + \sum_d \delta_d \text{race}_{dj} + \sum_g \gamma_g \text{controls}_{ijg} \quad [1]$$

The model includes sets of variables corresponding to dummy variables for the number of friend selections of the sender (friendliness), the number of persons who chose each receiver as a friend (popularity), a set of dummies for race of the receiver (one for each race), and a set of control variables for similarities in other characteristics of the persons in the dyad that may be the basis of friendship selection, including controls for the difference in class background between sender and receiver. By using

possible friendship choices as the unit of analysis, the model implicitly builds in dependence between school racial composition and the racial composition of friendship networks.

The model in [1] predicts the (log) odds that each receiver will be chosen as a friend by the i th individual, not the odds that a single selection of the i th individual will be an other-race friend. If the odds of choosing a black student relative to a white student are fixed across schools (as is the case in model [1]), as more black students enter the i th individuals choice set (their school), the chance that the i th individual will select a black friend increases. This model builds in a mathematical propinquity effect by which cross-race friendships will increase as other-race students increase in the pool of potential ties; the odds that any particular other-race person is selected as a friend are fixed. In later models, we enter terms allowing the odds that a receiver will be chosen to depend on school racial composition, thus allowing variation in the creation of cross-race friendships from this mathematical propinquity effect, as discussed further below.

For the race dummy variables, we use the sender's race as the reference category—the reference for whites is selecting a white friend, for blacks a black friend, etc. The coefficients of the race variables (the δ s) can be interpreted as the likelihood of nominating a receiver of another race relative to nominating a receiver of the sender's own race. Negative coefficients indicate that the sender is less likely to choose a person of the indicated race as a friend, relative to a member of his/her own race, whereas positive coefficients indicate that the sender's racial group is actually more likely to nominate a member of another racial group. Positive coefficients are unlikely to appear, since we expect at least weak within-race preferences for all racial groups.

These models also include basic control variables for other bases of friendship matching, including class and academic achievement. Most of these variables are the absolute value of the difference in characteristics between the sender and receiver. For instance, one of our basic measures of class is the absolute *difference in mothers' education* between the sender and receiver. We expect a negative coefficient for this variable, indicating that greater educational distance between students'

parents decreases the odds of friendship. We also include several other controls. A second class-matching control is a dummy variable coded 1 if both the *sender and receiver have mothers in a professional occupation*, based on student reports. To allow for friendship matching based on academic achievement, we include a variable for the absolute *difference in GPA* between pairs of students. Some past studies find that popular persons are more likely to be friends with other popular persons, so we include a variable for absolute *sender-receiver difference in number of persons who select a person as friend* (popularity). A dummy variable indicates that the *sender and receiver are in the same grade in school*, which past studies suggest strongly influences the likelihood of friendship. Finally, because the number of friendship selections is fixed but the number of dyads increases with school size, the odds that a particular person will be a friend decline with the size of the school. We control for this by including a control for the *log of the number of students in the school*.

In some models we control for class of the father as well, but this reduces the number of cases substantially because father information was collected only for fathers living in the same household as the student. As discussed further in the results section, we found that including father's background never influences the substantive results.

As in the P* models, we also include controls for the number of friends selected—friendliness or sender out-degree—and the number of persons who select an individual as a friend—popularity or receiver in-degree.¹⁷ Both are controlled with a series of dummy variables to allow for nonlinearity between these relationships and the probability of friend selection. (A respondent with five friends and a respondent with a popularity of five are the reference categories.) Main effects of sender and receiver characteristics—such as mother's education or respondent's gender—do not appear in this model, since

¹⁷The P* model includes dummy variables for each sender and receiver, rather than controls for number of friends selected. Like Moody (forthcoming), we control for number of friends and popularity rather than including dummies for each sender and receiver, because there are far too many persons in the sample to include so many dummy variable terms.

such characteristics would act on friendship nomination through sender friendliness or popularity (or through correlation with the size of the school), which are controlled in the model of friend selection.

Racial Composition Effects

After examining results of this baseline model, in a second set of models we interact the race dummy variables by the share of the school that is of that race, to allow for the possibility of students changing the odds that a receiver is selected based on the racial composition of the school. These composition effects allow us to assess change in the probability of selecting a friend of another race *relative to* the baseline expectation for interracial friendship based on the racial composition of the potential pools of friends. We interpret these as reflecting behavioral changes in friend-making behavior with shifts in the racial composition of the school population.

These interactions can be thought of as multilevel effects—the race composition interactions are school-level influences that alter the strength of student racial homophily. One good way to estimate these models would be with a multilevel model that allows for variance components at school and individual levels. The large number of dyads in our analysis, plus the fact that we use six basic racial and ethnic categories, however, makes it difficult to estimate these results using a full multilevel model.

Instead, we estimate these models using standard maximum-likelihood logistic regression techniques and then adjust the standard errors for school-level clustering in the sampling design.¹⁸ We correct the standard errors for all estimates using the Huber/White/Sandwich estimator to adjust for the school-level clustering, as implemented in the Stata statistical package (StataCorp, 2001). This substantially increases the standard errors for the school-level variables.

We represent school composition effects through a series of dummy variables. This allows for some nonlinearity in composition effects. As discussed in the text below, we do find nonlinear

¹⁸The major reason to use a multilevel model is to adjust standard errors for additional variance components. In theory, there is also some gain in the efficiency of estimates with a multilevel model, although in practice the gain in efficiency is usually small.

composition effects. Another possibility would be to use a quadratic or even cubic specification. We decided against adding higher-order polynomials because it makes the raw results more difficult to interpret and because quadratic smoothing is less "local" than use of dummy variables; although more flexible than a linear term, the quadratic specification still forces the data to follow a function form that may not follow the data well within certain ranges of the independent variable.

Potential Controls Excluded

As discussed above, our models control for several possible bases of friendship matching among students. Also worth mentioning are variables that we did not include in the models. We use a relatively simple model of friendship selection; we especially exclude controls that may result from patterns of friendship selection, rather than be a cause of it. Specifically, we do not include two additional sets of variables that sometimes are included in models of friendship selection: endogenous network effects that may act to intensify homophily, and measures of *value* homophily.

First, we did not include variables to capture inherent network regularities that often act to intensify homophily effects in friendship. These terms are usually included in P* models, but we believe they are best omitted given our theoretical concerns. The primary examples are terms representing transitivity and reciprocity. Transitivity reflects the principle that friendship between two individuals in network models is more likely if they have friends in common. Reciprocity represents the principle that individuals are more likely to select a friend if the friend reciprocates the choice.

In the context of race-based selection, endogenous network effects act to intensify initial race-based friendship selection. Take the example of a school with two racial groups, blacks and whites, in roughly equal proportion. If race is a reasonably strong influence on friendship, then black students will have mostly black friends and whites mostly white friends. In this context, transitivity intensifies segregation in friendship choices, because new friends are likely to be friends of existing friends, and friends of existing friends are mostly same-race.

Controlling for these network effects is logical for some assessments of network effects. If the goal of the analysis is to consider the extent of segregation that is *likely to result* in a school with a given racial mix, however, we believe it best not to eliminate the intensification of racial homophily by endogenous network factors. Race effects after "controlling out" this intensification would underestimate the degree of racial friendship segregation that is likely in a school with a given racial mix.

Likewise, controlling for a variable indicating that the receiver chooses the sender as a friend—a measure of reciprocity—will lead to underestimates of the total race effect. Controlling for reciprocity will "control out" part of the race effect, because the reciprocal choices made by receivers are partly race-guided.¹⁹

Second, we do not include measures of similarity of attitudes that might be the basis of homophily. We do not include these measures because they are as likely to be the result of friendship as to cause friendship (McPherson, Smith-Lovin, and Cook, 2001). Many sociological studies establish that friends influence values (e.g., Sewell, Haller, and Portes, 1969). Likewise, we exclude measures such as common club membership which may also result from friendship rather than being a cause of it. Any positive association between friendship selection and these variables is highly ambiguous, given the likely reverse causation.

RESULTS

We begin by considering how school racial composition influences the *size* of friendship networks. In the second stage, we examine how individual and school characteristics influence friendship *matching*, holding number of friends constant.

¹⁹Another way to think about this is as the difference between partial and total racial effects. Controlling for transitivity and reciprocity gives an answer to the question, "How much more likely is a same-race individual to be chosen as a friend than an individual of some other race, assuming equivalent positions in the network relative to the sender?" This eliminates from the race effect the fact that position in the sender's network is itself a product of race-based choices. The total effect, which we attempt to estimate, answers the question, "How overall racially segregated are friendships likely to be in a school with a given racial mix?"

Racial Composition and Within-School Friendship Formation

Table 1 presents an initial descriptive analysis of mean number of friends named by students in the Add Health study, by race and the racial composition of their school. The average number of friends named, including friends who are not in the school, is in the leftmost column. The remaining columns of Table 1 show the number of friends in the same school as the respondent, first overall and then for own-race and other-race friends. The rows contain means calculated separately by the percentage of the school that is of the same race as the respondent. For white Hispanics, we use the percentage of the school white, and for black Hispanics the percentage of the school black, because we found that these variables are more strongly related to friendship selection than the share Hispanic.

Do students have fewer within-school friendships when they are in the racial minority in a school, contrasted to being in the majority? Comparing the mean number of friends across the rows, there is a decline in the mean number of friends as the share of the population own-race declines. But this does not hold equally for all racial groups. The decline in total friends is strongest for whites (and white Hispanics) and does not hold for blacks (or black Hispanics). For whites, those in schools that are less than 10 percent white name 3.69 friends on average, while those schools that are in more than 60 percent white name an average of 4.12 friends.

The second column gives the mean number of friends named who are enrolled in the same school as the respondent.²⁰ As is the case for total friends, the mean number of within-school friends declines as the percentage of the school other-race increases. For several racial groups in Table 1, the decrease is a bit sharper for within-school friends than for total friends. This may be because in settings with few same-race friends, students substitute friends from outside the school setting for some of their within-school friends. Examining the breakdown of average in-school friends by race of friend, students do increase the number of other-race friends as the share own-race decreases, but the reduction in the number of same-

²⁰This is the mean number of in-school friends named who also appeared in the survey data. Within-school friends who were absent on the day of the survey are not included.

TABLE 1
Mean Number of Same Sex Friends, by Race and School Racial Composition

	All Friends Named	Friends in School	Own-Race Friends in School	Other-Race Friends in School
White Respondents (N=30,856)				
<10% white school	3.69	2.09	0.91	1.18
10-30% white school	3.85	2.12	1.03	1.09
30-60% white school	4.07	2.70	2.15	0.56
>60% white school	4.12	2.83	2.46	0.36
Black Respondents (N=7,423)				
<10% black school	3.61	2.11	0.88	1.23
10-30% black school	3.52	2.09	1.28	0.82
30-60% black school	3.63	2.19	1.50	0.70
>60% black school	3.56	2.56	1.96	0.60
White Hispanic Respondents (N=1,708)				
<10% white school	2.98	1.65	0.71	0.94
10-30% white school	3.59	2.02	0.70	1.31
30-60% white school	3.76	2.24	1.60	0.64
>60% white school	3.86	2.60	2.22	0.38
Black Hispanic Respondents (N=581)				
<10% black school	3.45	1.92	0.62	1.30
10-30% black school	2.79	1.68	0.84	0.84
30-60% black school	3.03	1.77	0.99	0.78
>60% black school	3.16	2.32	1.64	0.68
Other Hispanic Respondents (N=4,910)				
<10% Other Hispanic school	3.62	2.22	0.32	1.91
10-30% Other Hispanic school	3.58	2.00	0.96	1.04
30-60% Other Hispanic school	3.22	1.91	1.26	0.65
Asian Respondents (N=2,442)				
<10% Asian school	3.49	2.14	0.33	1.81
10-30% Asian school	3.83	2.32	1.35	0.97
Other Respondents (N=1,053)				
	3.71	2.32	0.15	2.17
Multiracial Respondents (N=4,117)				
	3.77	2.28	0.39	1.89

Source: Add Health In-School Questionnaire, 1994-1995.

Note: Own-race friends are white for whites, black for blacks, white or white Hispanic for white Hispanics, black or black Hispanic for black Hispanics, other or other Hispanic for other Hispanics, Asian for Asians, other race for persons of other race, and multiracial for multiracial persons.

race friends is greater than the gain in other-race friends, leading to an overall decline in within-school friends.

In the descriptive statistics in Table 1, student background factors that influence number of friends may be confounded with school racial composition. Table 2 shows coefficients from a censored-normal regression of the log of the number of within-school friends named (up to 5) on individual and school-level characteristics. The models incorporate a correction for the censoring of the data due to the fact that a maximum of five friends can be named. Model details and assumptions are discussed in the methods section.

Many of the racial composition effects we found in the descriptive results are statistically insignificant in the models of friend selection as shown in Table 2. A statistically significant relationship between racial composition and the total number of within-school friends holds only for whites and white Hispanics. Decreasing share own-race is associated with decline in the total number of within-school friends nominated, but only for white students.²¹ This may be because white students are accustomed to being in the majority and have special difficulty adjusting socially to schools in which they are in the minority. White students may also have more options for same-race friendships in settings outside of school, such as neighborhoods and clubs, and thus it may be easier for them to substitute same-race friends from other settings for friends at school.

Table 2 also includes a dummy variable for the presence of a busing program to increase racial diversity. The variable is never statistically significant. We find no evidence, then, that busing programs decrease the number of friends in school.

²¹ A related, but distinct, way to consider this problem is to consider how popularity varies with racial composition. Popularity is the number of persons who choose a given person as a friend. We also estimated models similar to Table 2 for popularity, shown in Appendix Table 1. The results parallel those for number of friends named. Average popularity varies with share own-race, a pattern that holds for whites (and white Hispanics) and Asians, and is statistically significant for these groups. Again, however, this pattern is not statistically significant for blacks (or black Hispanics).

TABLE 2
Censored-Normal Regression of Log of Number of Within-School Friends (up to 5) on Individual and School-Level Characteristics

	White		Black		White Hispanic		Black Hispanic		Other Hispanic		Asian	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Mother's education	0.002	0.006	0.018		0.019		0.040	0.019 *	-0.005		0.023	
GPA	0.188	0.015 *	0.135	0.025 *	0.078	0.027 *	0.080	0.065	0.119	0.027 *	0.119	0.044 *
Mother professional	0.098	0.024 *	0.037	0.038	0.055	0.084	0.065	0.105	0.070	0.051	0.153	0.074 *
Respondent male	-0.387	0.027 *	-0.455	0.048 *	-0.301	0.054 *	-0.460	0.106 *	-0.232	0.033 *	-0.193	0.058 *
Grade-in-school dummies	Yes		Yes		Yes		Yes		Yes		Yes	
School Composition Effects												
0-10% own race	-0.364	0.140 *	0.092	0.101	-0.372	0.112 *	0.231	0.188	-0.049	0.083	-0.210	0.118
10-30% own race	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
30-60% own race	-0.028	0.115	0.052	0.091	-0.080	0.126	0.060	0.179	-0.077	0.087	dropped	
60%+ own race	0.015	0.121	0.031	0.109	0.002	0.136	0.253	0.193	dropped		dropped	
School Controls												
Busing	-0.276	0.193	-0.195	0.161	0.161	0.193	0.041	0.231	0.015	0.168	-0.141	0.211
Private school (vs. public)	-0.035	0.108	0.400	0.118 *	0.215	0.217	0.195	0.251	0.384	0.117 *	0.177	0.130
Urban school	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
Suburban school	0.215	0.064 *	0.088	0.086	0.296	0.083 *	-0.019	0.152	0.035	0.072	0.266	0.099 *
Rural school	0.263	0.080 *	0.457	0.114 *	0.240	0.134	0.276	0.234	0.189	0.114	0.489	0.114 *
Dummies for region	Yes		Yes		Yes		Yes		Yes		Yes	
N (uncensored)	9649		3261		818		308		2399		987	
N (right censored)	21207		4162		890		273		2511		1455	
Log likelihood	-25668.9		-7405.8		-1711.9		-642.0		-5118.9		-2325.7	

Note: "Own race" is white for whites, black for blacks, Asian for Asians, white for white Hispanics, black for black Hispanics, and Hispanic for other Hispanics. Cases are considered right-censored if respondent names five friends, even if not all five are within-school.

Race and Hispanic Origin in Friendship Matching

We now turn to models of the matching of students within schools as friends, or friendship selection. As discussed in the data and methods sections, we take dyads as the basic unit of analysis, consistent with the P* model approach. The dependent variable is a dummy indicating 1 if the sender chooses the receiver as a friend and 0 if not. The models include controls for the characteristics of the pair of students in the dyad and hold constant the number of friends selected. Because the number of friends is held constant, variables that should act primarily through these variables, including nonmatching characteristics of the sender (like gender of the sender, since we examine only same-sex friendships) and school characteristics, are not included in the model.²² Since the number of interracial dyads in the data is determined by the racial composition of the school, these models implicitly incorporate school racial composition effects on friendship networks.

Table 3 shows the estimated coefficients of the friendship selection models. Separate models are estimated for senders of each racial/Hispanic origin group. The race-of-receiver coefficients indicate the log odds that a receiver of the indicated race is selected as a friend relative to a receiver of the same race as the sender.

Unsurprisingly, the coefficients for the race variables are negative, indicating that respondents are less likely to choose an individual of another race than an individual of their own race (the reference category) as a friend. Race matching is generally strong, but some racial combinations are greater barriers to friendship than others. The large negative coefficient for white choice of blacks (-1.57) indicates that the odds of a white student nominating a specific black receiver as a friend are only about 21 percent ($e^{-1.57} = .208$) as large as the odds of nominating a specific white receiver as a friend. The coefficient for black choice of a white friend, relative to a black friend, is more negative (-2.20), indicating that the odds of a black respondent nominating a white receiver as a friend are only about 11 percent ($e^{-2.20} = .111$) as

²²We also estimated models separately for each gender, to consider gender differences in the process of selecting other-race friends. We found almost no differences in friendship matching by gender.

TABLE 3
Logit Models of Interracial Friendship Dyads

	White		Black		White Hispanic		Black Hispanic		Other Hispanic		Asian	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Race Coefficients												
Receiver White	(reference)		-2.197	0.155 *	-0.394	0.062 *	-2.307	0.300 *	-1.168	0.112 *	-1.339	0.092 *
Receiver Black	-1.574	0.116 *	(reference)		-1.600	0.216 *	-0.411	0.214	-1.638	0.200 *	-2.223	0.273 *
Receiver White Hispanic	-0.059	0.038	-1.549	0.231 *	(reference)		-1.700	0.559 *	-0.428	0.124 *	-1.560	0.168 *
Receiver Black Hispanic	-1.636	0.220 *	-0.147	0.084	-0.560	0.382	(reference)		-1.196	0.226	-2.561	0.492 *
Receiver Other Hispanic	-0.632	0.087 *	-1.680	0.190 *	-0.108	0.070	-1.241	0.373 *	(reference)		-1.986	0.181 *
Receiver Asian	-0.304	0.072 *	-1.791	0.253 *	-0.622	0.190 *	-2.254	0.501 *	-1.434	0.266 *	(reference)	
Receiver Other Race	-0.167	0.047 *	-0.830	0.139 *	-0.484	0.150 *	-1.068	0.382 *	-0.836	0.157 *	-1.132	0.214 *
Receiver Multiple Race	-0.219	0.030 *	-0.478	0.102 *	-0.424	0.091 *	-0.684	0.276 *	-0.763	0.120 *	-1.102	0.168 *
Controls												
Same Grade	2.679	0.059 *	2.318	0.136 *	2.396	0.084 *	2.322	0.125 *	2.301	0.089 *	2.946	0.160 *
Size of School (logged)	-0.875	0.047 *	-0.721	0.087 *	-0.844	0.049 *	-0.615	0.111 *	-0.825	0.074 *	-0.780	0.109 *
Difference in Popularity	-0.088	0.004 *	-0.075	0.013 *	-0.099	0.014 *	-0.072	0.029 *	-0.107	0.016 *	-0.121	0.020 *
Network Variables												
Dummies for friendliness	yes		yes		yes		yes		yes		yes	
Dummies for popularity	yes		yes		yes		yes		yes		yes	
N (dyads)	60,9692		243,195		357,962		72,831		189,585		177,663	
Log likelihood	-17484		-5478				-1499				-3770	

* = Coefficient / Standard Error > 2.

great as nominating a black receiver as a friend. Whites are very unlikely to choose black or black Hispanic friends, and blacks are very unlikely to choose white or white Hispanic friends. But whites are nearly as likely to choose white Hispanics as non-Hispanic whites, and blacks are nearly as likely to choose black Hispanics as non-Hispanic blacks.

The friendship nominations of Asian students also show high levels of within-group selection, as evidenced by the large negative coefficients for Asian selection of all other racial groups. Asian students are unlikely to nominate white or black students in their schools for friendship relative to other Asian students. Whites, however, are substantially more likely than blacks to be nominated as friends by Asian students.²³

The friendship selections of white Hispanics are fairly similar to whites, while friendship selections of black Hispanics are fairly similar to blacks. There is some matching on the basis of Hispanic ethnicity—Hispanic students are more likely to nominate a schoolmate of Hispanic descent than a non-Hispanic schoolmate of the same race. The white-black division, however, is strongly evident in the friendship choices of white and black Hispanic students.

We group students who indicate that they are of Hispanic descent, but then choose the other race category or do not select a race, into the category "other Hispanic." Like other racial groups, we find strong evidence of own-race bias in the friendship selections of other Hispanics. Other Hispanics are most likely to nominate schoolmates who are also other Hispanic as friends, followed by white Hispanics.

Class and Academic Achievement in Friendship Formation

The models presented in Table 3 do not control for other dimensions of status along which friendship matching occurs. It may be that racial matching in friendship in fact reflects class matching, for instance, rather than friendship matching based on race per se.

²³The strong within-race selection of Asians in part reflects the fact that Asians make up very small shares of the student population, as is discussed further below when school racial composition variables are introduced.

The models in Table 4 add measures of class background and academic achievement. We use two indicators of relative class between senders and receivers. To account for matching on mother's education, we include distance (or absolute difference) between years of education of the sender's mother and the receiver's mother. Likewise, to account for friendship matching on mother's occupation, we include a dummy variable for sender and receiver having mothers in professional occupations. The negative coefficient of the educational distance variable for all racial groups confirms that there is matching on the basis of class background—greater educational distance decreases the likelihood of friendship selection. Likewise, the positive coefficient of the "professional mothers" variable indicates matching on the basis of mother's occupation. Class-matching effects using these two indicators, however, are far weaker than most racial effects. A 20-year difference in mothers' education is not as great a barrier to friendship as race between black and white students.

GPA is also included to indicate possible friendship formation among students on the basis of academic achievement. Again, we use absolute difference between sender's and receiver's GPAs to indicate GPA matching. The negative coefficients indicate that students are more likely to be friends with students who have similar grades in school. GPA matching is much stronger than matching effects on the basis of class, and rivals the weaker race selection effects.²⁴

Does race matching in adolescent friendship really reflect class differences between students? The coefficients in Tables 3 and 4 answer a definitive "no" to that question. The race coefficients change very little from the models in Table 3 to those in Table 4. The extent of race matching is almost unchanged when we control for class background and/or academic achievement.

²⁴GPA may also be influenced by friendship. My GPA may tend to become more similar to my friend's GPA over time because the friend encourages similar study habits and because of cooperative learning behavior. This would increase the apparent GPA matching effect. In terms of explaining the race effect, however, this likely biases the race effect downward when this control is included. In other words, if we could account for this effect, the effect of the GPA variables on reducing apparent race effects would be even smaller than we observe.

TABLE 4
Logit Models of Interracial Friendship Dyads, Including Class and Achievement Controls

	White		Black		White Hispanic		Black Hispanic		Other Hispanic		Asian	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Race Variables												
Receiver White	(reference)		-2.169	0.154 *	-0.417	0.059 *	-2.278	0.302 *	-1.160	0.105 *	-1.297	0.095 *
Receiver Black	-1.544	0.116 *	(reference)		-1.606	0.211 *	-0.413	0.211	-1.639	0.199 *	-2.136	0.283 *
Receiver White Hispanic	-0.034	0.038	-1.518	0.231 *	(reference)		-1.693	0.558 *	-0.430	0.122 *	-1.455	0.156 *
Receiver Black Hispanic	-1.586	0.213 *	-0.135	0.084	-0.575	0.386	(reference)		-1.179	0.226 *	-2.421	0.501 *
Receiver Other Hispanic	-0.549	0.079 *	-1.629	0.188 *	-0.104	0.068	-1.218	0.367 *	(reference)		-1.808	0.190 *
Receiver Asian	-0.300	0.076 *	-1.758	0.247 *	-0.618	0.191 *	-2.199	0.499 *	-1.337	0.258 *	(reference)	
Receiver Other Race	-0.142	0.045 *	-0.811	0.140 *	-0.496	0.148 *	-1.032	0.382 *	-0.827	0.152 *	-1.094	0.206 *
Receiver Multiple Race	-0.198	0.029 *	-0.460	0.100 *	-0.438	0.092 *	-0.664	0.274 *	-0.754	0.118 *	-1.042	0.165 *
Class and Achievement												
Mother Educational Distance	-0.051	0.005 *	-0.039	0.013 *	-0.034	0.011 *	-0.008	0.016	-0.073	0.014 *	-0.032	0.009 *
Both Moms Professional	0.112	0.028 *	0.166	0.056 *	0.183	0.084 *	0.183	0.147	0.224	0.057 *	0.021	0.070
GPA Distance	-0.397	0.020 *	-0.219	0.021 *	-0.336	0.031 *	-0.208	0.076 *	-0.354	0.029 *	-0.452	0.049 *
Controls												
Same Grade	2.678	0.060 *	2.319	0.138 *	2.395	0.083 *	2.327	0.124 *	2.304	0.089 *	2.945	0.159 *
Size of School (logged)	-0.876	0.049 *	-0.730	0.089 *	-0.852	0.048 *	-0.619	0.111 *	-0.819	0.070 *	-0.743	0.106 *
Difference in Popularity	-0.084	0.004 *	-0.072	0.013 *	-0.098	0.014 *	-0.068	0.028 *	-0.104	0.016 *	-0.114	0.020 *
Network Variables												
Dummies for friendliness	yes		yes		yes		yes		yes		yes	
Dummies for popularity	yes		yes		yes		yes		yes		yes	
N (dyads)	609,692		243,195		357,962		72,831		189,585		177,663	
Log likelihood	-17364		-5463		-6426		-1496		-2807		-3744	

* = Coefficient / Standard Error > 2.

These models employ a modest number of controls for class, and no measure of the class background of the father. Because the Add Health in-school survey only asked for the educational achievement of fathers who live at home (whether biological, step, foster, or adoptive), data on fathers are missing for many cases. We estimated models including variables for matching on father's education and father's professional occupation as well. Matching on father's background is similar in strength to matching on mother's background. We found no change in the strength of race matching effects when these additional class controls were included.²⁵

School Racial Composition

To this point, the models imply that the odds of selecting a receiver of a certain race as a friend do not vary with the racial composition of the school. Yet the relative size of racial groups may result in changes in friend-making behaviors in ways that influence the extent of racial homophily, either because relative size influences school racial climate or because students alter their behavior in diverse environments to maintain racially homogeneous networks.

To account for this possibility, the models in Table 5 include interactions between the racial selection parameters and school racial composition. Racial percentages are given by a series of dummy variables indicating the percentage of the school population composed of each racial and ethnic group. These allow the strength of racial selection to vary depending on the racial composition of the school, relative to a baseline propinquity effect based on the pool of potential friends (receivers).

The coefficients in the shaded cells of Table 5 indicate change in own-race friend selection with the share of the school own-race, relative to own-race selection in schools in the reference category of less than 10 percent own-race. Almost all of these coefficients are negative (except for other Hispanics), and they increase in magnitude with increasing share of the school of the sender's race. These negative coefficients indicate that own-race selection tendencies become weaker as the share of the school

²⁵Appendix Table 2 shows the models including father's class background variables.

TABLE 5
Logit Models including School Racial Composition Interactions, by Race of Sender

Variables	White		Black		White Hispanic		Black Hispanic		Other Hispanic		Asian	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Main Race Effects												
Receiver White	(reference)		-3.75	0.16 *	-0.20	0.08 *	-4.03	0.62 *	-1.35	0.31 *	-2.30	0.20 *
Receiver Black	-3.24	0.27 *	(reference)		-1.92	0.37 *	-0.43	0.56	-1.74	0.38 *	-2.28	0.28 *
Receiver White Hispanic	-1.30	0.56 *	-2.94	0.26 *	(reference)		-3.25	0.65 *	-0.63	0.26 *	-2.47	0.27 *
Receiver Black Hispanic	-2.91	0.28 *	-0.29	0.19	-0.87	0.54	(reference)		-1.02	0.39 *	-2.58	0.64 *
Receiver Other Hispanic	-2.54	0.26 *	-2.65	0.22 *	-0.72	0.29 *	-19.34	0.74 *	(reference)		-1.30	0.22 *
Receiver Asian	-2.16	0.25 *	-2.64	0.24 *	-0.34	0.20	-3.46	0.93 *	-1.01	0.31 *	(reference)	
Receiver Other Race	-2.21	0.26 *	-2.35	0.18 *	-0.55	0.14 *	-2.59	0.63 *	-1.10	0.30 *	-1.99	0.21 *
Receiver Multiple Race	-2.28	0.25 *	-1.98	0.12 *	-0.63	0.11 *	-2.29	0.53 *	-1.03	0.26 *	-1.98	0.19 *
School Composition Effects												
0-10% White*Revr White	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
10-30% White*Revr White	-1.26	0.30 *	-0.08	0.21	-0.40	0.11 *	-0.09	0.44	-0.12	0.18	0.05	0.17
30-60% White*Revr White	-2.02	0.26 *	0.48	0.22 *	-0.47	0.09 *	1.00	0.39 *	0.07	0.18	0.19	0.18
60-100% White*Revr White	-2.11	0.25 *	dropped		dropped		dropped		dropped		dropped	
0-10% Black*Revr Black	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
10-30% Black*Revr Black	-0.75	0.22 *	-0.87	0.13 *	-0.17	0.46	-1.09	0.21 *	-0.14	0.35	-1.00	0.39 *
30-60% Black*Revr Black	-0.34	0.23	-1.71	0.15 *	0.71	0.42	-1.97	0.20 *	-0.47	0.40	-1.21	0.36 *
60-100% Black*Revr Black	-0.61	0.74	-1.93	0.11 *	1.13	0.36 *	-1.96	0.14 *	0.72	0.30 *	0.29	0.19
0-10% White*Revr WH	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
10-30% White*Revr WH	-0.40	0.49	-0.34	0.45	-0.29	0.34	0.37	0.99	-0.48	0.17 *	0.06	0.32
30-60% White*Revr WH	-0.80	0.48	-0.37	0.47	-1.13	0.63	dropped		-0.46	0.64	0.56	0.50
0-10% Black*Revr BH	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
10-30% Black*Revr BH	-2.10	0.40 *	-0.74	0.28 *	-0.33	0.94	-0.98	0.63	-0.73	0.42	dropped	
30-60% Black*Revr BH	-1.31	0.57 *	-1.74	0.27 *	1.27	0.79	-2.07	0.59 *	-1.68	0.59 *	dropped	
60-100% Black*Revr BH	dropped		-1.65	0.18 *	1.81	0.54 *	-1.85	0.66 *	dropped		dropped	
0-10% OH*Revr OH	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
10-30% OH*Revr OH	-0.08	0.16	-0.30	0.36	0.40	0.39	16.74	0.46 *	0.28	0.29	-1.45	0.23 *
30-60% OH*Revr OH	-0.23	0.26	-1.08	0.29 *	0.63	0.30 *	16.46		-0.42	0.27	-1.80	0.33 *
0-10% Asian*Revr Asian	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
10-30% Asian*Revr Asian	-0.42	0.12 *	-0.91	0.32 *	-0.76	0.32 *	-0.43	0.86	-0.79	0.30 *	-0.99	0.17 *

(table continues)

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TABLE 5, continued

Variables	White		Black		White Hispanic		Black Hispanic		Other Hispanic		Asian	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Controls												
Mother Educational Distance	-0.05	0.01 *	-0.03	0.01 *	-0.04	0.01 *	0.00	0.02	-0.07	0.01 *	-0.03	0.01 *
Both Moms Professional	0.10	0.03 *	0.21	0.04 *	0.21	0.08 *	0.13	0.14	0.19	0.06 *	0.02	0.07
GPA Distance	-0.40	0.02 *	-0.24	0.02 *	-0.33	0.03 *	-0.26	0.08 *	-0.36	0.03 *	-0.46	0.05 *
Difference in Popularity	-0.08	0.00 *	-0.07	0.01 *	-0.10	0.01 *	-0.06	0.03 *	-0.10	0.02 *	-0.12	0.02 *
Sndr. & Revr. in Same Grade	2.67	0.06 *	2.28	0.14 *	2.38	0.08 *	2.27	0.14 *	2.32	0.08 *	2.92	0.15 *
Size of School (logged)	-0.87	0.05 *	-0.83	0.06 *	-0.89	0.04 *	-0.78	0.09 *	-0.79	0.06 *	-0.76	0.10 *
Dummies for friendliness	Yes		Yes		Yes		Yes		Yes		Yes	
Dummies for popularity	Yes		Yes		Yes		Yes		Yes		Yes	
N (dyads)	560,321		225,287		324,985		65,649		174,486		165,162	
Log likelihood	-16,096		-4,995		-5,843		-1,378		-2,597		-3,566	

* = Coefficient / Standard Error > 2.

Note: Shaded cells indicate composition effects on own-race friend selection.

population own-race increases. Own-race selection is strongest for students who are members of a racial group making up less than 10 percent of the student population. The coefficients change most between the reference category (less than 10 percent own-race) and the next category of 10–30 percent, change significantly between 10–30 percent and 30–60 percent, and then change only a little more for 60–100 percent own-race schools. This implies that own-race friend selection is by far most likely for students in a racial minority in their school (less than 10 percent and 10–30 percent), becomes weaker for students in 30–60 percent own-race schools, and does not change much further in 60–100 percent own-race schools.

We find, then, that friend-making behavior differs depending on school racial composition, with an increase in own-race selection tendencies for students in small racial minorities in their school. The racial composition effects on own-race selection are strong. For instance, the odds are about eight times as great that a white person will choose a white receiver as a friend in a 60–100 percent white school as in a 0–10 percent white school ($e^{-2.11} = .12 \approx 1/8$).

If the odds of a same-race friendship nomination decline as the share of the school that is same-race increases, then the odds of an other-race friendship nomination should increase correspondingly. The coefficients for racial composition effects on friendship selection for members of other racial groups, which are not shaded in Table 5, more often than not display this pattern, but this result is not always apparent (in part because the effect is split across five other racial groups). The clearest effect of composition is to increase own-race selection tendencies in situations in which one's own group is in a small minority.

These differences in composition also explain some differences in overall degree of own-race bias among groups. In Table 3, for instance, whites are more likely to choose black friends than blacks are to choose white friends (although neither group is very likely to select the other). In Table 5, we see that this results from the different racial compositions typically faced by these groups—blacks are more often in a small racial minority within their school than whites are. When school racial composition is controlled, whites and blacks are about equally likely to name members of the other group as friends.

How much of total friendship segregation, then, is a result of the segregation of schools? Table 6 draws implications of these models for the overall share of friends of another race. Panel A of Table 6 gives the percentage distribution of friends nominated in the raw Add Health data, broken down by sender's race, as a basis for comparison.

Panels B and C show the estimates of percentage of friends of each race, based on predictions for hypothetical schools with relatively integrated racial compositions. The models shown in Table 5 are used for the predictions. In both hypothetical schools, all students are of the same class background and have the same GPA—thus class differences are controlled. In this hypothetical school, the distribution of racial groups is even across grades, and all students are equally popular.

Panel B of Table 6 gives the predicted share of friends of each race for senders of each race for a hypothetical school in which the racial mix of the school is equal to the overall racial distribution of students in the Add Health data (except we assume no students are in the multiracial or other categories). The estimates are based on the models in Table 5. Friendship networks are less segregated than in the raw descriptive data (panel A), but are still highly segregated. Whites and white Hispanics still have mostly white friends, while blacks and black Hispanics have mostly black friends. Asians have mostly white and Asian friends.

Panel C of Table 6 gives estimated share of friends of each race for a hypothetical school with a racial composition that is numerically integrated—with equal shares white, black, Asian, white Hispanic, black Hispanic, and other Hispanic students. For all groups, the majority of their friends' nominations are of the same race as themselves, except for white Hispanics, who are most likely to select other Hispanic friends. Whites also have many white Hispanic friends, and blacks have many black Hispanic friends.

The results do show a school propinquity effect—interracial friends increase with desegregation. But because the odds of choosing a particular individual of one's own race increase as the share of the school own-race declines, and because the odds of other-race selection are low to begin with, the number of other-race friends in a school does not increase nearly as quickly as the number of other-race dyads. In

TABLE 6
Friend Distributions, by Race, in Raw Data and in Hypothetical School Populations

Hypothetical School Composition	Receiver Race	Sender Race					
		White	Black	White Hispanic	Black Hispanic	Other Hispanic	Asian
A. Frequency Distribution of Race of Named School Friends in Add Health In-School Survey							
	White	82.1%	6.7%	36.8%	25.6%	19.0%	23.7%
	Black	1.6	63.2	14.9	4.7	4.2	3.0
	White Hispanic	2.3	4.9	14.1	5.7	7.1	1.4
	Black Hispanic	0.2	0.2	1.0	7.2	2.5	0.2
	Other Hispanic	2.7	2.6	17.7	35.7	53.4	5.6
	Asian	1.7	1.0	2.0	3.8	3.2	47.0
B. Estimated Share of Friends of Each Race in a Hypothetical School with Composition Reflecting Student Race Distribution							
61.0%	White	75.9	22.9	60.5	26.1	56.1	47.7
17.0%	Black	3.5	55.3	6.8	51.8	11.1	4.5
4.0%	White Hispanic	4.8	1.4	2.6	2.6	4.6	3.5
2.0%	Black Hispanic	0.3	9.1	3.1	15.2	2.9	0.0
8.0%	Other Hispanic	6.4	5.5	14.9	0.0	15.9	11.7
8.0%	Asian	9.1	5.9	12.1	4.3	9.4	32.6
C. Estimated Share of Friends of Each Race in Hypothetical School with Numerically Equal Racial Groups							
17.0%	White	41.2	3.3	20.0	2.5	10.4	17.9
17.0%	Black	3.4	48.0	6.4	33.8	9.3	6.8
16.0%	White Hispanic	30.3	3.8	19.1	5.2	12.8	10.5
16.0%	Black Hispanic	1.3	33.1	11.6	42.0	9.8	0.0
17.0%	Other Hispanic	11.5	7.5	29.0	14.8	50.5	11.2
17.0%	Asian	12.3	4.3	13.8	1.8	7.2	53.7

Notes: Estimates in Panels B and C are based on models in Table 5. All models assume that students have parents with the same class background and GPA, and are equally popular.

school environments that are racially balanced, friendship segregation is reduced, but nevertheless most friends are of the same race as the sender. In this sense, homophily is a stronger force than school-level propinquity in interracial friendship formation.

Manipulation of School Racial Composition: Are There Additional Effects on Friendship Formation?

Our analysis to this point is based on a cross-sectional analysis of friendship patterns across schools with a variety of racial compositions. Most of these schools have racial compositions based on enrollments from a given geographic area or district designated by local authorities. Some schools, however, have racial compositions that result from explicit efforts to assign racial groups from several areas to achieve a desired racial and ethnic composition—usually involving busing. Is racial segregation of friendship affected by such policies?

Table 7 shows selected coefficients from models of friendship selection that allow race selection effects to vary, contrasting schools that have busing programs with those that do not. The coefficients of the busing interactions are usually not statistically significant. This leads us to the conclusion that busing has little effect on friendship selection. The coefficients that are significant usually display positive other-race selection effects—indicating greater likelihood of selecting an other-race friend relative to a similar school without busing. White students in schools with busing are more likely to choose both white and black friends relative to white students in schools without busing, but the increase in likelihood of selection is greater for black receivers than for white receivers. We conclude that busing programs appear to have no clear effect on interracial friendship selections, contrasted to otherwise similar schools without busing.²⁶

This conclusion differs from Moody's (forthcoming) finding that the racial segregation of friendships is greater in schools with busing. We cannot be sure of the exact reason for the difference in

²⁶Of course, schools with busing programs will probably tend to be more racially diverse than is typical for other schools. Friendship selections will then be subject to resulting effects of school racial composition, as discussed above.

TABLE 7
Coefficients of Busing/Race-of-Friend Interactions, Full Models

	White		Black		White Hispanic		Black Hispanic		Other Hispanic		Asian	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Busing * Friend White	0.602	0.208 *	0.721	0.197 *	0.300	0.329	0.122	0.493	0.191	0.226	0.254	0.344
Busing * Friend Black	0.909	0.265 *	0.064	0.271	0.098	0.545	0.365	0.220	-0.579	0.454	0.629	0.589
Busing * Friend White Hispanic	0.638	0.361	0.883	0.653	0.283	0.591	dropped		0.051	0.352	1.426	0.654 *
Busing * Friend Black Hispanic	-0.275	0.871	0.575	0.265 *	0.528	0.735	dropped		dropped		dropped	
Busing * Friend Other Hispanic	0.612	0.376	-0.317	0.192	-0.122	0.112	-0.469	0.609	0.235	0.104 *	0.154	0.566
Busing * Friend Asian	-0.092	0.170	-0.301	0.601	1.068	0.345 *	dropped		0.238	0.193	0.256	0.279
N (dyads)	560,140		225,287		324,973		65,334		174,477		165,109	
Log likelihood	-16.071		-4.994		-5.841		-1.377		-2,594		-3,564	

Notes: Models also include all variables shown in Table 5. Due to the small number of black Hispanic students in schools with busing, some estimates cannot be computed.

* = Coefficient / Standard Error > 2.

results because of the many differences between our procedures and Moody's. We can think of one likely explanation: Moody examines total racial segregation, without separately considering races involved. Schools with busing in the Add Health data have higher shares black than schools without busing. Because black-white friendship segregation is stronger than friendship segregation among most other racial groups, schools with large shares of black and white students are likely to have more racially segregated friendship networks than schools with other racial compositions.

DISCUSSION

If current trends continue, Hispanic students will soon be the largest nonwhite group in schools, and Asians will be 10 percent of all students by midcentury (Orfield and Yun, 1999). Will the increasing prevalence of these new immigrant minorities break down high levels of racial social segregation among students? What do these results imply about friendship segregation in the increasingly multiracial American schools of the future?

We find evidence consistent with change in the extent of friendship segregation, but to a greater extent we find continuity. Our results indicate that there will be more interracial friendships in schools as the share of students who are Hispanic and Asian increases, both because of propinquity effects and because race is less of a barrier to friendship between whites, Asians, and Hispanics than it is among whites and blacks. The results also suggest, however, that high levels of social segregation on the basis of race will continue. Rather than a breakdown of racial segregation in friendship, our results suggest balkanization of friendships among an increasing number of racial groups. Even in numerically integrated multiracial schools, within-race friendships will continue to be the rule rather than the exception.

We also find evidence that black-white divisions will continue to be important in multiracial schools, because black-white racial distinctions are highly consequential for the friendships of students of Hispanic descent. The racial identification of Hispanics is a good predictor of the race of their friends—the friends of white Hispanics are mostly white and white Hispanic, and the friends of black

Hispanics are mostly black and black Hispanic. Disturbingly, we find especially high levels of segregation of blacks, including black Hispanics, from other racial groups. Because of the significance of black-white divisions among Hispanics, social segregation in increasingly Hispanic schools of the future will have many similarities to current divisions in black-white schools.

Given the significance of the color line in other areas of life, it is not surprising that we find that friendships in schools remain strongly divided by race. Interracial interaction within schools cannot be completely isolated from the racial divisions outside of schools. Schools are promising institutions to take steps toward reducing racial divisions, but a sweeping decline in school social segregation will require a reduction in the salience of race outside of the school context.

CONCLUSIONS

Adolescence is often described as the period when racial identity and racial awareness crystallize. Consistent with this view, we find that race operates very strongly on adolescent friendship. Race similarity is a far better predictor of friendship formation than is parental class similarity. Very little of the racial segregation in friendship actually reflects class differences.

All racial groups in this study demonstrate own-race favoritism in their friendship nominations. Asians and Hispanics demonstrate own-race selection tendencies in friendship that are only slightly weaker than the own-race selections of whites and blacks; the reason that Asians and Hispanics have more interracial friendships is because of their relatively small proportion of school populations, not because of weak own-race selection among Asians and Hispanics. The racial identity of Hispanic respondents who indicate their race as white or black is strongly salient to friendship choices. White Hispanics and black Hispanics are more likely to select white or black friends, respectively, than Hispanic friends of other races.

Proximity does influence cross-race friendship. Students in racially diverse schools do have more interracial friendships than those in more homogeneous schools. We find evidence, however, that

aspects of friend-making behavior change for members of racial groups in small minorities in ways that partially counteract the diversifying effect of propinquity on their friendship nominations. Among white students, a shortage of same-race peers is associated with some decrease in the overall number of within-school friends. This may be because white students in schools with few other white students make many of their best friends among white peers outside of school. Further, students in schools in which they are a small racial minority, consisting of less than 10 percent of the student population, substantially strengthen their own-race selection tendencies. We believe this to be because students desire several friends of their own racial group, and alter their friend-making behavior to achieve this goal when there are few same-race friends in their school.

On a more positive note, we do not find that there are additional negative effects of school busing programs on interracial friendship formation. Interracial friendship patterns in schools with busing are relatively similar to patterns in schools of similar racial compositions whose student bodies enroll based on residence in a geographic district.

A caveat to the conclusions of this study is that the results reflect the organizational and racial environments present in our sample of American junior and senior high schools. We do not investigate how organizational practices within schools may influence these outcomes, in part because the Add Health study includes little or no information on many organizational practices that may be important.²⁷ If school officials managed desegregated environments differently, or if race relations in the communities in which these schools were located were to improve, greater gains in interracial friendships in integrated environments might be achieved.

²⁷The Add Health data do not provide information, for instance, on classroom-level racial segregation. Nor does Add Health identify the track each student is in, although it does identify whether there is any tracking within the school. Earlier studies find that tracking increases friendship segregation relative to schools without tracking, although the effect is small (Hallinan and Williams, 1989; Kubitschek and Hallinan, 1998). Thus, we doubt that racial segregation would be much lower in schools without tracking.

APPENDIX TABLE 1
Negative Binomial Regression of Popularity on Individual and School-Level Characteristics

	White		Black		White Hispanic		Black Hispanic		Other Hispanic		Asian	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Individual Controls												
Mother's education	0.016	0.004 *	0.011	0.007	0.030	0.011 *	0.030	0.015	0.000	0.007	0.019	0.010
GPA	0.121	0.009 *	0.129	0.020 *	0.034	0.023	0.043	0.055	0.080	0.023 *	0.101	0.038 *
Mother professional	0.029	0.012 *	0.039	0.031	0.014	0.050	-0.069	0.101	0.103	0.033 *	0.034	0.036
Respondent male	-0.181	0.013 *	-0.251	0.035 *	-0.207	0.051 *	-0.346	0.109 *	-0.213	0.034 *	-0.111	0.033 *
Grade-in-school dummies	yes		yes		yes		yes		yes		yes	
School Composition Effects												
0-10% own race	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
10-30% own race	0.230	0.119	-0.081	0.086	0.231	0.102 *	-0.240	0.180	-0.016	0.070	0.195	0.076 *
30-60% own race	0.273	0.069 *	-0.013	0.084	0.203	0.079 *	-0.113	0.199	0.056	0.092	(dropped)	
60%+ own race	0.294	0.070 *	0.001	0.097	0.273	0.077 *	-0.263	0.195	(dropped)		(dropped)	
School Controls												
Busing	-0.174	0.207	-0.060	0.098	-0.097	0.146	0.079	0.281	0.071	0.157	0.018	0.186
Public school	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
Private school	-0.023	0.078	0.203	0.086 *	0.160	0.097	-0.534	0.198 *	0.124	0.144	0.040	0.074
Urban school	(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
Suburban school	0.191	0.053 *	0.124	0.069	0.225	0.066 *	0.282	0.128 *	0.129	0.062 *	0.223	0.114
Rural school	0.235	0.066 *	0.326	0.080 *	0.280	0.105 *	0.659	0.149 *	0.349	0.100 *	0.349	0.121 *
Dummies for region	Yes		Yes		Yes		Yes		Yes		Yes	
N	30,163		7,190		1,644		557		4,718		2,382	
Log likelihood	-61,959		-13,838		-3,098		-1,026		-8,710		-4,600	

Note: "Own race" is white for whites, black for blacks, Asian for Asians, white for white Hispanic, black for black Hispanic, and Hispanic for other Hispanic.

* = Coefficient / Standard Error > 2.

APPENDIX TABLE 2
Models Including Class Controls for Father

	White		Black		White Hispanic		Black Hispanic		Other Hispanic		Asian	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Receiver White	(reference)		-2.247	0.142 *	-0.522	0.077 *	-1.932	0.393 *	-1.149	0.103 *	-1.296	0.097 *
Receiver Black	-1.477	0.137 *	(reference)		-1.564	0.253 *	-0.036	0.292	-1.773	0.276 *	-2.010	0.245 *
Receiver White Hispanic	-0.011	0.053	-1.378	0.306 *	(reference)		-1.016	0.682	-0.417	0.121 *	-1.192	0.226 *
Receiver Black Hispanic	-1.395	0.252 *	-0.392	0.152 *	-0.104	0.538	(reference)		-1.643	0.492 *	-3.039	1.074 *
Receiver Other Hispanic	-0.510	0.079 *	-1.573	0.222 *	-0.123	0.102	-0.960	0.631	(reference)		-1.558	0.254 *
Receiver Asian	-0.290	0.084 *	-1.696	0.241 *	-0.757	0.217 *	-1.753	0.682 *	-1.299	0.285 *	(reference)	
Receiver Other Race	-0.151	0.056 *	-0.826	0.218 *	-0.374	0.185 *	-0.687	0.590	-0.795	0.163 *	-1.014	0.199 *
Receiver Multiple Race	-0.170	0.036 *	-0.617	0.112 *	-0.643	0.152 *	-0.530	0.492	-0.801	0.141 *	-0.992	0.164 *
Same Grade	2.746	0.065 *	2.424	0.143 *	2.515	0.091 *	2.229	0.208 *	2.368	0.089 *	2.971	0.136 *
Size of School (logged)	-0.887	0.050 *	-0.832	0.096 *	-0.855	0.057 *	-0.672	0.152 *	-0.801	0.080 *	-0.749	0.112 *
Difference in Popularity	-0.080	0.005 *	-0.064	0.016 *	-0.098	0.017 *	-0.073	0.045	-0.111	0.021 *	-0.099	0.020 *
Mother Educational Distance	-0.040	0.005 *	-0.014	0.013	-0.022	0.018	-0.054	0.040	-0.055	0.011 *	-0.005	0.011
Both Moms Professional	0.089	0.026 *	0.197	0.062 *	0.291	0.093 *	-0.074	0.264	0.137	0.073	0.067	0.062
GPA Distance	-0.385	0.022 *	-0.209	0.046 *	-0.357	0.043 *	-0.255	0.140	-0.353	0.043 *	-0.483	0.052 *
Father Educational Distance	-0.048	0.005 *	-0.023	0.011 *	-0.017	0.018	0.002	0.042	-0.035	0.014 *	-0.031	0.014 *
Both Dads Professional	0.175	0.028 *	0.363	0.132 *	0.098	0.095	0.355	0.338	0.331	0.086 *	0.063	0.056
Sender out-degree (dummies)	yes		yes		yes		yes		yes		yes	
Popularity (dummies)	yes		yes		yes		yes		yes		yes	
N (dyads)	317,842		64,190		118,967		13,805		64,082		83,626	
Log likelihood	-11,269		-1,664		-3,303		-462		-1,383		-2,550	

References

- Allport, Gordon. 1954. *The Nature of Prejudice*. Cambridge, MA: Addison-Wesley.
- Anderson, Carolyn J., Stanley Wasserman, and Bradley Crouch. 1999. "A P* Primer: Logit Models for Social Networks." *Social Networks* 21: 37-66.
- Bearman, Peter S., Jo Jones, and J. Richard Udry. 1997. "The National Longitudinal Study of Adolescent Health: Research Design." Available on the Web at <<http://www.cpc.unc.edu/addhealth>>.
- Blau, Peter. 1977. *Inequality and Heterogeneity: A Primitive Theory of Social Structure*. New York: Free Press.
- Clotfelter, Charles. 2000. "Interracial Contact in High-School Extracurricular Activities." National Bureau of Economic Research Working Paper No. W7999.
- Feld, Scott L. 1981. "The Focused Organization of Social Ties." *American Journal of Sociology* 86: 1015-1035.
- Feld, Scott L., and William C. Carter. 1998. "When Desegregation Reduces Interracial Contact: A Class Size Paradox for Weak Ties." *American Journal of Sociology* 103 (5): 1165-1186.
- Festinger, Leon, Stanley Schachter, and Kurt Back. 1950. *Social Pressures in Informal Groups: A Study of Human Factors in Housing*. Stanford: Stanford University Press.
- Fischer, Claude. 1982. *To Dwell among Friends: Personal Networks in Town and City*. Chicago: University of Chicago Press.
- Gerard, Harold, and Norman Miller. 1975. *School Desegregation: A Long-Term Study*. New York: Plenum Press.
- Hallinan, Maureen. 1974. *The Structure of Positive Sentiment*. Amsterdam: Elsevier Scientific.
- Hallinan, Maureen T. 1982. "Classroom Racial Composition and Children's Friendships." *Social Forces* 61: 56-72.
- Hallinan, Maureen T., and Stevens S. Smith. 1985. "The Effects of Classroom Racial Composition on Students' Interracial Friendliness." *Social Psychology Quarterly* 48 (1): 3-16.
- Hallinan, Maureen, and Ruy A. Teixeira. 1987. "Opportunities and Constraints: Black-White Differences in the Formation of Interracial Friendships." *Child Development* 58: 1358-1371.
- Hallinan, Maureen T., and Richard A. Williams. 1989. "Interracial Friendship Choices in Secondary Schools." *American Sociological Review* 54 (1): 67-78.
- Joyner, Kara, and Grace Kao. 2000. "School Racial Composition and Adolescent Racial Homophily." *Social Science Quarterly* 81 (3): 810-825.
- Kandel, Denise. 1978. "Homophily, Selection, and Socialization in Adolescent Friendships." *American Journal of Sociology* 84: 427-436.

- Kubitschek, Warren, and Maureen Hallinan. 1998. "Tracking and Students' Friendships." *Social Psychology Quarterly* 61: 1-15.
- Lazarsfeld, Paul, and Robert Merton. 1954. "Friendship as a Social Process: A Substantive and Methodological Analysis." In *Freedom and Control in Modern Society*, edited by M. Berger. New York: Van Nostrand. Pp. 18-66.
- Laumann, Edward. 1973. *Bonds of Pluralism: The Form and Substance of Urban Social Networks*. New York: Wiley.
- Long, Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage Publications.
- Massey, Douglas S., and Nancy Denton. 1987. "Trends in the Racial Segregation of Blacks, Hispanics, and Asians: 1970-1980." *American Sociological Review* 52 (6): 802-825.
- McPherson, Miller, Lynn Smith-Lovin, and James M. Cook. 2001. "Birds of a Feather: Homophily and Social Networks." *Annual Review of Sociology* 27: 415-444.
- Moody, James. Forthcoming. "Race, School Integration, and Friendship Segregation in America." *American Journal of Sociology*.
- Newcomb, Theodore. 1961. *The Acquaintance Process*. New York: Holt.
- Orfield, Gary, and John T. Yun. 1999. "Resegregation in American Schools." Harvard, MA: A report of the Civil Rights Project of Harvard University. Available on the Web at <http://www.law.harvard.edu/civilrights/publications/>.
- Patchen, M. 1982. *Black-White Contact in Schools: Its Social and Academic Effects*. West Lafayette, IN: Purdue University Press.
- Powers, Daniel A., and Christopher G. Ellison. 1995. "Interracial Contact and Black Racial Attitudes: The Contact Hypothesis and Selectivity Bias." *Social Forces* 74 (1): 205-226.
- Qian, Zhenchao. 1997. "Breaking the Racial Barriers: Variation in Interracial Marriage between 1980 and 1990." *Demography* 34: 263-276.
- St. John, Nancy H., and Ralph G. Lewis. 1975. "Race and the Social Structure of the Elementary Classroom." *Sociology of Education* 48 (3): 346-368.
- Schofield, Janet, and H. A. Sagar. 1977. "Peer Interaction Patterns in an Integrated Middle School." *Sociometry* 40: 130-138.
- Schofield, Janet Ward. 1982. *Black and White in School: Trust, Tension, or Tolerance?* New York: Praeger.
- Schofield, Janet Ward, and Bernard E. Whitley. 1983. "Peer Nomination vs. Rating Scale Measurement in Children's Peer Preferences." *Social Psychology Quarterly* 46 (3): 242-251.
- Sewell, William, Archibald Haller, and Alejandro Portes. 1969. "The Educational and Early Occupational Attainment Process." *American Sociological Review* 34 (1): 82-92.

- StataCorp. 2001. *Stata Statistical Software: Release 7.0*. College Station, TX: Stata Corporation.
- Tatum, Beverly Daniel. 1987. *Assimilation Blues: Black Families in a White Community*. New York: Basic Books.
- Tatum, Beverly Daniel. 1999. *Why Are All the Black Kids Sitting Together in the Cafeteria?* New York: Basic Books.
- Tudor, Jeannette. 1971. "The Development of Class Awareness in Children." *Social Forces* 49: 470-476.
- Wasserman, Stanley, and Philippa Pattison. 1996. "Logit Models and Logistic Regression for Social Networks: I. An Introduction to Markov Graphs and P*." *Psychometrika* 61 (3): 401-425.

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